IN THE CLAIMS

1. (Currently Amended) A method of designing a line system, the method comprising the steps of:

obtaining a set of one or more demands for use in computing the line system design, wherein the one or more demands comprise one or more bandwidth requests; and

representing the line system design as a graph in accordance with a graph coloring operation wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost.

2. (Original) The method of claim 1, wherein colors are partitioned in sets and the sets are ordered so that colors in higher sets cost more than colors in lower sets.

3. (Original) The method of claim 2, wherein a link of the graph represents a location of a component of the line system being designed.

4. (Original) The method of claim 3, wherein the cost of a link in a coloring is equal to the cost of the most expensive set such that a demand going through the link is colored with a color in the most expensive set.

5. (Original) The method of claim 3, further wherein colors are assigned to the demands such that no two demands routed on the same link of the graph are assigned the same color.

6. (Original) The method of claim 1, wherein the line system being designed is a linear line system.

7. (Original) The method of claim 6, wherein the line system design is represented by an interval graph.

8. (Allowed) A method of designing a line system, the method comprising the steps of:

obtaining a set of one or more demands for use in computing the line system design; and

representing the line system design as a graph in accordance with a graph coloring operation, wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost;

wherein the graph coloring operation is computable to an $O(\sqrt{s})$ -approximation, where s is a value proportional to a number of color sets.

9. (Original) The method of claim 1, wherein the graph coloring operation is polynomially computable.

10. (Original) The method of claim 1, wherein the line system being designed is a circular line system.

11. (Allowed) A method of designing a line system, the method comprising the steps of:

obtaining a set of one or more demands for use in computing the line system design, wherein the line system being designed is a circular line system; and

representing the line system design as a graph in accordance with a graph coloring operation, wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost;

wherein the graph coloring operation is computable to a $2(1 + \epsilon)$-approximation.

12. (Original) The method of claim 10, wherein a link of the graph represents a location of a component of the circular line system being designed.

13. (Original) The method of claim 12, wherein a demand is routed either clockwise or counterclockwise and colors are assigned to demands such that no two demands routed on the same link are assigned the same color.

14. (Original) The method of claim 1, wherein the line system being designed is an optical line system.

15. (Currently Amended) Apparatus for designing a line system, the apparatus comprising:

a memory; and

at least one processor coupled to the memory and operative to: (i) obtain a set of one or more demands for use in computing the line system design, wherein the one or more demands comprise one or more bandwidth requests; and (ii) represent the line system design as a graph in accordance with a graph coloring operation wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost.

16. (Original) The apparatus of claim 15, wherein colors are partitioned in sets and the sets are ordered so that colors in higher sets cost more than colors in lower sets.

17. (Original) The apparatus of claim 16, wherein a link of the graph represents a location of a component of the line system being designed.

18. (Original) The apparatus of claim 17, wherein the cost of a link in a coloring is equal to the cost of the most expensive set such that a demand going through the link is colored with a color in the most expensive set.

19. (Original) The apparatus of claim 17, further wherein colors are assigned to the demands such that no two demands routed on the same link of the graph are assigned the same color.

20. (Original) The apparatus of claim 15, wherein the line system being designed is a linear line system.

21. (Original) The apparatus of claim 20, wherein the line system design is represented by an interval graph.

22. (Allowed) Apparatus for designing a line system, the apparatus comprising:

a memory; and

at least one processor coupled to the memory and operative to: (i) obtain a set of one or more demands for use in computing the line system design; and (ii) represent the line system design as a graph in accordance with a graph coloring operation wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost;

wherein the graph coloring operation is computable to an $O(\sqrt{s})$ -approximation, where s is a value proportional to a number of color sets.

23. (Original) The apparatus of claim 15, wherein the graph coloring operation is polynomially computable.

24. (Original) The apparatus of claim 15, wherein the line system being designed is a circular line system.

25. (Allowed) Apparatus for designing a line system, the apparatus comprising:

a memory; and

at least one processor coupled to the memory and operative to: (i) obtain a set of one or more demands for use in computing the line system design, wherein the line system being designed is a circular line system; and (ii) represent the line system design as a graph in accordance with a graph coloring operation wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost;

wherein the graph coloring operation is computable to a $2(1 + \epsilon)$-approximation.

26. (Original) The apparatus of claim 24, wherein a link of the graph represents a location of a component of the circular line system being designed.

27. (Original) The apparatus of claim 26, wherein a demand is routed either clockwise or counterclockwise and colors are assigned to demands such that no two demands routed on the same link are assigned the same color.

28. (Original) The apparatus of claim 15, wherein the line system being designed is an optical line system.

29. (Currently Amended) An article of manufacture for designing a line system, comprising a machine readable medium containing one or more programs which when executed implement the steps of:

obtaining a set of one or more demands for use in computing the line system design, wherein the one or more demands comprise one or more bandwidth requests; and

representing the line system design as a graph in accordance with a graph coloring operation wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost.